

1           1.    A multiband MIMO-based dual-mode portable station  
2   of 3G W-CDMA and UWB communication receiver comprising:  
3               a MIMO-based dual-mode 3G W-CDMA and UWB  
4   filtering and multicarrier RF section;  
5               a 3G W-CDMA baseband processor;  
6               an UWB OFDM multiband baseband processor;  
7               a 3G W-CDMA and UWB OFDM multiband control  
8   processor; and  
9               a multiple antenna unit.

10           2.   The multiband MIMO-based dual-mode portable  
11   station of 3G W-CDMA and UWB communication receiver of  
12   claim 1 wherein said MIMO-based dual-mode 3G W-CDMA and UWB  
13   filtering and multicarrier RF section includes two-LNA,  
14   two-AGC, two analog bandpass filters, two dual-switch, a 3G  
15   W-CDMA down converter and demodulation, an UWB multiband  
16   down converter and demodulation, and a A/D unit.

17           3.   The multiband MIMO-based dual-mode portable  
18   station of 3G W-CDMA and UWB communication receiver of  
19   claim 2 wherein said two dual-switch are to provide  
20   information from the two analog bandpass filters either to  
21   the 3G W-CDMA down converter and demodulation or to the UWB  
22   multiband down converter and demodulation.

23           4.    The multiband MIMO-based dual-mode portable  
24   station of 3G W-CDMA and UWB communication receiver of  
25   claim 3 wherein said two dual-switch may be controlled with  
26   only one of the two dual-switch connecting.

27           5.    The multiband MIMO-based dual-mode portable  
28   station of 3G W-CDMA and UWB communication receiver of  
29   claim 2 wherein said 3G W-CDMA down converter and  
30   demodulation includes a 3G W-CDMA sum over a block  
31   duration, two multicarriers, and two channel select  
32   filters.

33           6.    The multiband MIMO-based dual-mode portable  
34   station of 3G W-CDMA and UWB communication receiver of  
35   claim 5 wherein said 3G W-CDMA down converter and  
36   demodulation is a QPSK demodulation.

37           7.    The multiband MIMO-based dual-mode portable  
38   station of 3G W-CDMA and UWB communication receiver of  
39   claim 2 wherein said UWB multiband down converter and  
40   demodulation includes an UWB sum over a block duration and  
41   four multiband down converters and demodulations.

42           8.    The multiband MIMO-based dual-mode portable  
43   station of 3G W-CDMA and UWB communication receiver of

44 claim 7 wherein said four multiband down converters and  
45 demodulations are equal.

46 9. The multiband MIMO-based dual-mode portable  
47 station of 3G W-CDMA and UWB communication receiver of  
48 claim 2 wherein said A/D unit has two switches and eight  
49 A/D converters.

50 10. The multiband MIMO-based dual-mode portable  
51 station of 3G W-CDMA and UWB communication receiver of  
52 claim 9 wherein said eight A/D converters has the same  
53 sampling frequency rate and resolution.

54 11. The multiband MIMO-based dual-mode portable  
55 station of 3G W-CDMA and UWB communication receiver of  
56 claim 9 wherein said two switches connects either two 3G W-  
57 CDMA input signals or two UWB input signals.

58 12. The multiband MIMO-based dual-mode portable  
59 station of 3G W-CDMA and UWB communication receiver of  
60 claim 9 wherein said only two A/D converters operate in  
61 parallel during the 3G W-CDMA receiver mode.

62 13. The multiband MIMO-based dual-mode portable  
63 station of 3G W-CDMA and UWB communication receiver of

64 claim 9 wherein said eight A/D converters operate in  
65 parallel during the UWB receiver mode.

66 14. The multiband MIMO-based dual-mode portable  
67 station of 3G W-CDMA and UWB communication receiver of  
68 claim 1 wherein said 3G W-CDMA baseband processor comprises  
69 two digital filters, two down samplings, a MUX, and a  
70 multiband rake receiver and decoder unit.

71 15. The multiband MIMO-based dual-mode portable  
72 station of 3G W-CDMA and UWB communication receiver of  
73 claim 14 wherein said multiband rake receiver and decoder  
74 unit includes twelve complex modulations, twelve digital  
75 filters, twelve despreaders and rake units, a MUX, a long  
76 code user-p mask, a long code generator, a XOR, a  
77 deinterleaver, a desymbol repetition, and a decoder.

78 16. The multiband MIMO-based dual-mode portable  
79 station of 3G W-CDMA and UWB communication receiver of  
80 claim 1 wherein said UWB OFDM multiband baseband processor  
81 includes a combination section of a digital receiver filter  
82 unit, a multiband dispreading unit, and a TEQ unit, four  
83 S/P, four guard removing, four combination of FFT and FEQ,  
84 five P/S, and a despreading, deinterleaver and decoding  
85 unit.

86           17. The multiband MIMO-based dual-mode portable  
87 station of 3G W-CDMA and UWB communication receiver of  
88 claim 16 wherein said combination section of a digital  
89 receiver filter unit, a multiband dispreading unit, and a  
90 TEQ unit contains eight digital receiver filters, eight-  
91 XOR, four-multiband-despreading, four-MUX, and four-TEQ.

92           18. The multiband MIMO-based dual-mode portable  
93 station of 3G W-CDMA and UWB communication receiver of  
94 claim 16 wherein the each of four combination of FFT and  
95 FEQ includes 1024-point FFT and 500 N-tap equalizers, 500  
96 decision detector units, and an adaptive algorithm.

97           19. The multiband MIMO-based dual-mode portable  
98 station of 3G W-CDMA and UWB communication receiver of  
99 claim 1 wherein said 3G W-CDMA and UWB OFDM multiband  
100 control processor may be a digital signal processor, or a  
101 microcontroller, or a combination of both processors.

102           20. The multiband MIMO-based dual-mode portable  
103 station of 3G W-CDMA and UWB communication receiver of  
104 claim 1 wherein said multiple antenna unit includes two  
105 independent and identification antennas.

106           21. A dual-mode communication receiver of 3G W-CDMA  
107 and UWB communication portable station comprises two

108 antennas, a MIMO-based dual-mode 3G W-CDMA and UWB  
109 filtering and multicarrier RF section, a 3G W-CDMA baseband  
110 processor, an UWB OFDM multiband baseband processor, a 3G  
111 W-CDMA and UWB OFDM multiband control processor, and a  
112 sharing memory bank.

113         22. The dual-mode communication receiver of 3G W-CDMA  
114 and UWB communication portable station of claim 21 wherein  
115 said UWB OFDM multiband baseband processor deals with four  
116 OFDM multi-frequency bands, with each of 512 MHz.

117         23. The dual-mode communication receiver of 3G W-CDMA  
118 and UWB communication portable station of claim 21 wherein  
119 said 3G W-CDMA and UWB OFDM multiband control processor  
120 controls data flow exchanging in the receiver.

121         24. A system, comprising:  
122         a multiband MIMO-based 3G W-CDMA and UWB  
123         communications including:  
124                 P-user 3G and UWB portable stations;  
125                 a MIMO-based 3G W-CDMA base station coupled to 3G  
126         W-CDMA network interface section;  
127                 a MIMO-based UWB base station coupled to UWB  
128         network interface section; and  
129                 a MIMO channel.

130           25. The system of claim 24, wherein the 3G and UWB  
131 portable station comprises a multiband MIMO-based dual-mode  
132 transceiver of 3G W-CDMA and UWB communication.